User's Manual

FST-811
FST-812
FST-812S15/812S35/812S50
FST-815A
FST-816A20/816B20

10/100Base-TX to 100Base-FX Smart Media Converter



Trademarks

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FCC Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the Instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE Mark Warning

This is a Class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

WEEE Warning



To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.

Revision

PLANET 10/100Base-TX to 100Base-FX Smart Media Converter User's Manual

MULTI-MODE: FST-811/ FST-812

SINGLE-MODE: FST-812S15 / FST-812S35 / FST-812S50 / FST-816A20 / FST-816B20

REVISION: 1.0 (OCTOBER.2009)

Part No.: EM-FST81x_v1.0 (2080-AA1130-001)

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Checklist

Thank you for purchasing PLANET 10/100Base-TX to 100Base-FX Smart Media Converter, the 10/100Base-TX to 100Base-FX Smart Media Converter package shall contain following contents:

Check the contents of your package for following parts:

- 10/100Base-TX to 100Base-FX Smart Media Converter x1
- User's Manual CD x1
- DC 5V 2A Power Adapter x1

If any of these pieces are missing or damaged, please contact your dealer immediately, if possible, retain the carton including the original packing material, and use them against to repack the product in case there is a need to return it to us for repair.

1.2 About the 10/100Base-TX to 100Base-FX Smart Media Converter

The FST-81x series Smart Media Converter provide Media conversion between 10/100Base-TX and 100Base-FX interfaces, such as multi-mode ST/SC connectors (2km), single-mode SC connector (15/35/50km), single-mode LC connectors (2/20/40/60km) and single fiber connector (WDM,20km) fiber connection options for various application.

The FST-81x series Smart Media Converter provide Auto MDI/MDI-X on its TP port and store-and-forward mechanism for eliminate faulty packets. Use the DIP switch from the FST-81x to configure the available smart functions, such as the flow control / Link Pass Through function (LLCF/LLR). The Flow Control function allows FST-81x supported routers and servers to directly connect to FST-81x for fast, reliable data transfer. The Link Loss Carry Forward (LLCF) function works with Link Loss Return (LLR) to diagnose network connections. Furthermore, the LLR function can immediately alarm network administrator the media link issue and provide efficient solution to monitor the entire network.

The FST-81x series allows two easy types of connection. These Smart Media Converters can be used as a standalone unit when powered by its DC adapter or used as a slide-in module to the PLANET 19-inch Web Smart / Managed 16-Slots Media Converter Chassis (MC-1600MR/MC-1600MR48 & MC-1610MR / MC-1610MR48). When working with the Web Smart / Managed Media Converter Chassis, the FST-81x is able to be centrally managed and its status be monitored through the local RS-232 console and remote web interface.

Ingress / Egress bandwidth control function support on both TP and Fiber interface of FST-81x to enhance bandwidth utilization, Before FST-81x power outage situation appears, the new Dying Gasp feature enables network administrator to receive message from FST-81x and get information about FST-81x loss power for further check and restore.

Moreover, when FST-81x is installed into MC-1610MR / MC-1610MR48 Managed Media Converter Chassis, the TS-1000/802.3ah OAM protocol (operations, administration, and maintenance) function helps remote device be centrally managed and monitored under Managed Media Converter Chassis Web interface.

1.3 Features

- **Standards:**
  - Complies with IEEE 802.3 10Base-T, IEEE 802.3u 100Base-TX, IEEE 802.3u 100Base-FX Ethernet Standard
- **Interface:**
  - One **10/100Base-TX** port with RJ-45 connector
  - One **100Base-FX** port with LC/SC/WDM connector supporting multi-mode or single-mode fiber optic cable
  - Auto-Negotiation and Auto-MDI / MDI-X for 10/100Base-TX port
- **Layer 2 Features:**
  - Back-Pressure & IEEE 802.3x compliant flow control and full wire-speed forwarding rate
  - Link Loss Return (**LLR**) switch on each fiber optic to aid in troubleshooting remote network connections
  - Link Loss Carry Forward (**LLCF**) work with LLR in diagnosing network connections
- **Smart Management:**
  - Provides DIP switch for Flow control (Disable / Enable) and LFP function (Disable / Enable) setting
  - Manageable through Web Smart / Managed Media Converter Chassis System (MC-1600MR/MC-1610MR series)
  - **Bandwidth control** / **TS-1000 OAM** / **IEEE 802.3ah OAM** / **Loop Back Test** function provided with MC-1610MR / MC-1610MR48 Managed Media Converter Chassis System
  - **Dying Gasp feature support** (FT-90x series Web Smart Fast Ethernet Converter can receive Dying Gasp message sent out by FST-81x)
- **Hardware:**
  - Act as a standalone device or work with Web Smart / Managed Media Converter Chassis for up to 16 converters with redundant power supply for use of optional expansion
  - LED indicators for converter status
  - Choice of fiber-connector from SC, LC, WDM, multi-mode / single-mode fiber / 100Base-FX mini GBIC module
  - EMI standards complies with FCC, CE class B

1.4 Specification

Model	FST-811	FST-812	FST-815A	FST-812S15	FST-812S35	FST-812S50	FST-816A 20	FST-816B 20
Hardware Specification								
Standards	IEEE 802.3 10Base-T, IEEE 802.3u 100Base-TX and 100Base-FX							
Ports	1 10/100Base-TX port , 1 100Base-FX port							
Fiber connector	ST	SC	SFP	SC	SC	SC	SC, WDM	SC, WDM
Wavelength Deploy-ment	1310nm (Transmit and Receive)						1310 (TX) 1550 (RX)	1550 (TX) 1310 (RX)
Cable	10Base-T: 2-pair Cat. 3,4,5 UTP cable, up to 100 meters 100Base-TX: 2-pair Cat. 5 UTP cable, up to 100 meters 100Base-FX: 50/125µm or 62.5/125µm multi-mode fiber cable, up to 2km. 9/125µm single-mode cable, provide long distance for 2/15/20/35/40/50/60km							
Maximum Cable dis-tance	MM,2km	MM,2km	SM, 60km (MFB-F60)	SM, 15km	SM,35km	SM, 50km	SM, 20km Single wire	SM, 20km Single wire
LED indicator	System: PWR TP: LNK/ACT, 100 FX: LNK/ACT							
DIP switch	Flow control (Disable / Enable) , LFP function (Disable / Enable)							
Speed	Ethernet: 10/20Mbps for half / full-duplex Fast Ethernet: 100/200Mbps for half / full-duplex							
Power input	DC 5V 2A							
Power consumption	2.8 Watts / 9 BTU (maximum)							
Operate environment	0~50 Degree C, 5%~90%RH							
Storage environment	-10~70 Degree C, 5%~90%RH							
Dimension (W x D xH)	81 x 94 x 26 mm							
Weight	0.22kg							
Emission	FCC Class B, CE mark							

1.5 Product Outlook

Right View: there is one RJ-45 twisted-Pair jack (Auto-MDI/MDI-X), one fiber-optic connector (vary by model) and six LED indicators.

Left View: there is one DC jack for DC 5V power adapter.

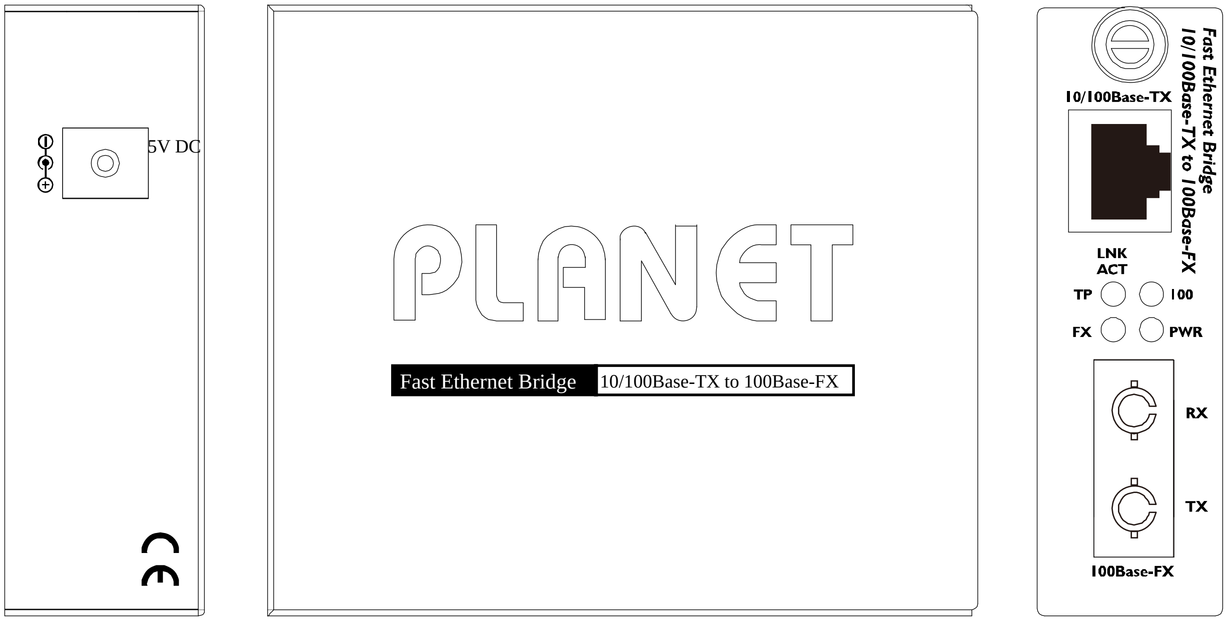


Figure 1: FST-811 Outlook

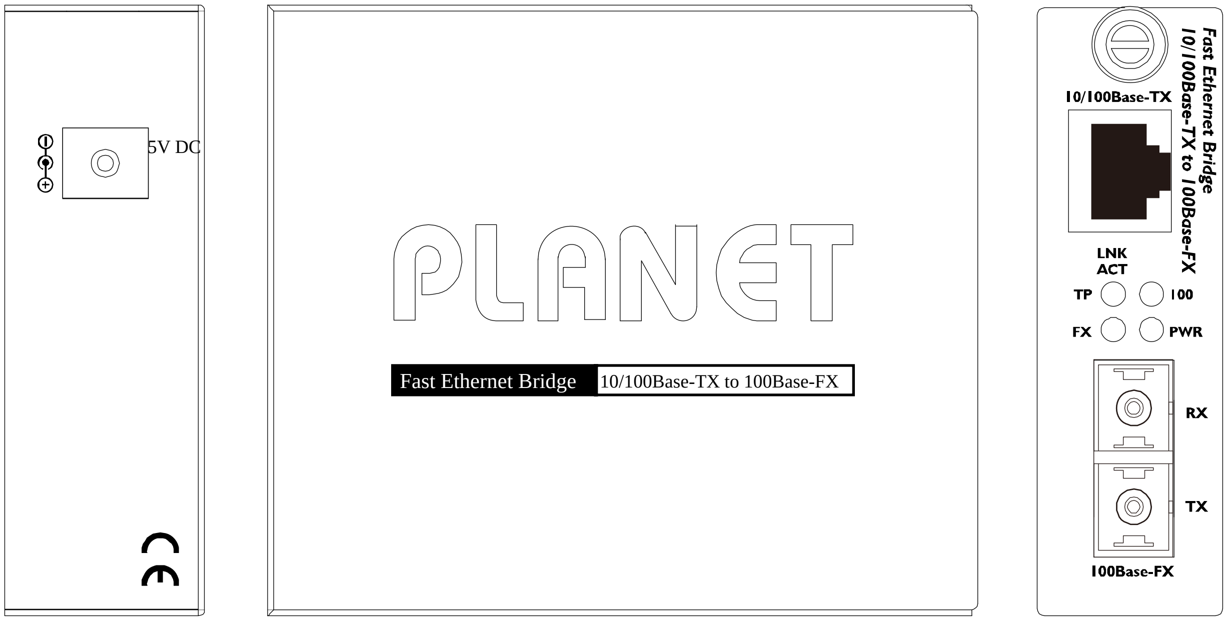


Figure 2: FST-812 / FST-812S15 / FST-812S35 / FST-812S50 Outlook

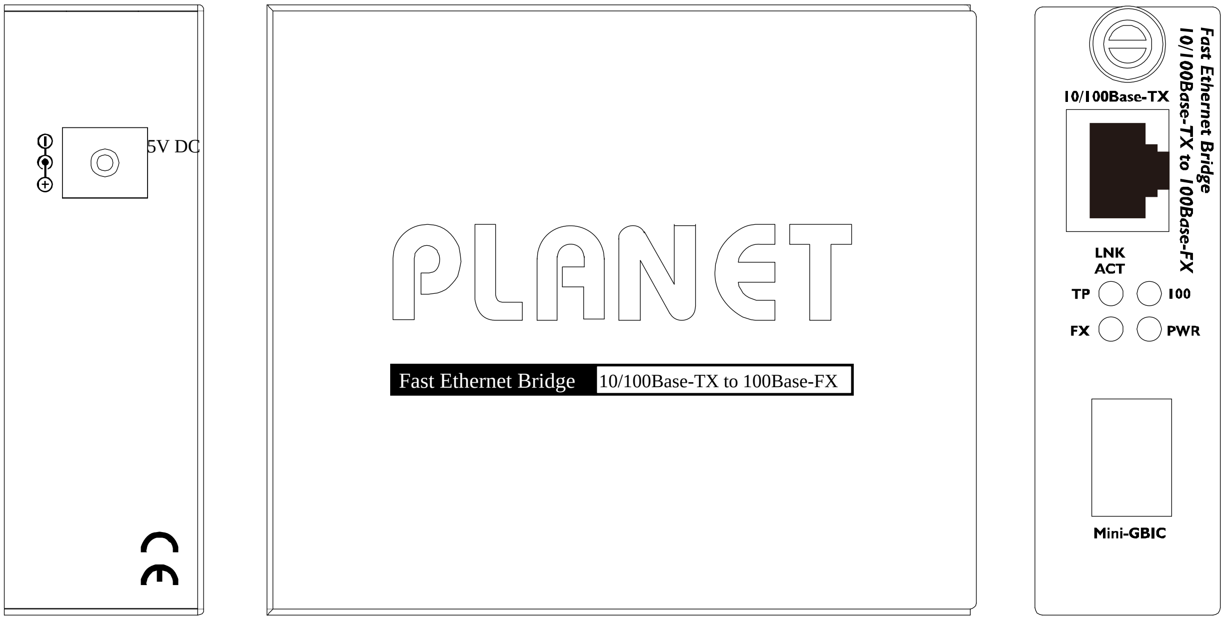


Figure 3: FST-815A Outlook

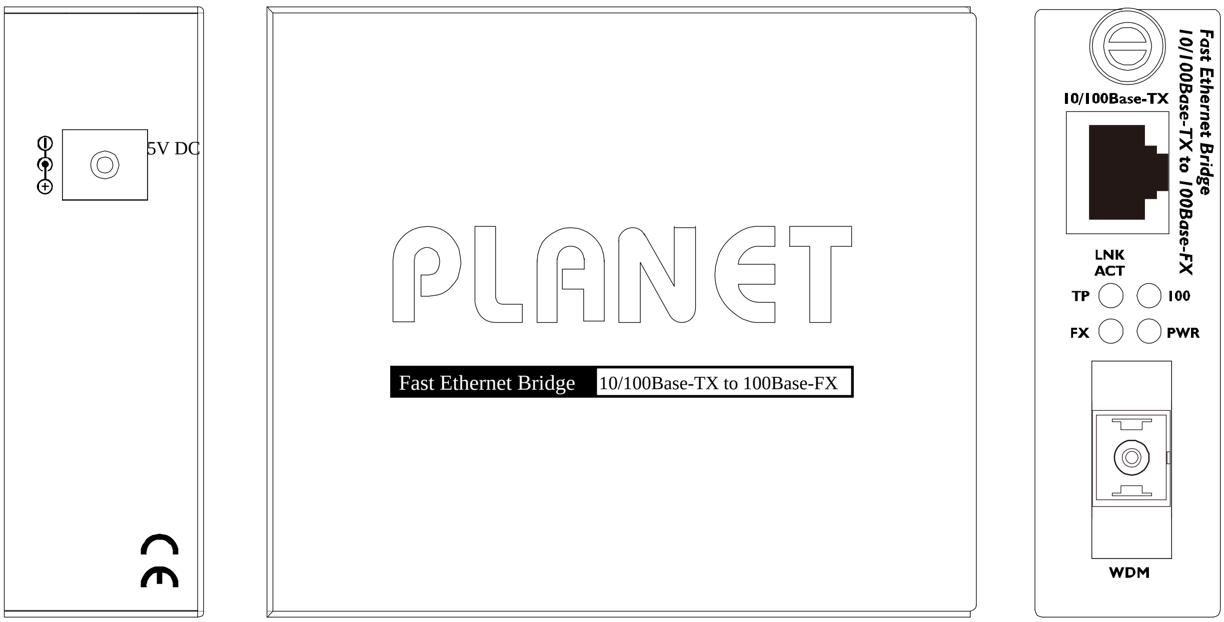


Figure 4: FST-816A20 / FST-816B20 Outlook

LED Indicators

LED	Color	Status	Indication
PWR(Power)	**Green**	Lights On	Power on – when +5V DC detected.
		Lights Off	Power off.
TP 100	**Green**	Lights On	The port is operating at 100Mbps.
		Lights Off	The port is operating at 10Mbps.
TP LINK/ACT	**Green**	Lights On	The link through that port is successfully established.
		Lights Off	The link through that port is not established.
		Lights Blinking	Data transmitting or receiving on that port.
FX LINK/ACT	**Green**	Lights On	The link through that port is successfully established.
		Lights Off	The link through that port is not established.
		Lights Blinking	Data transmitting or receiving on that port.

2. HARDWARE INSTALLATION

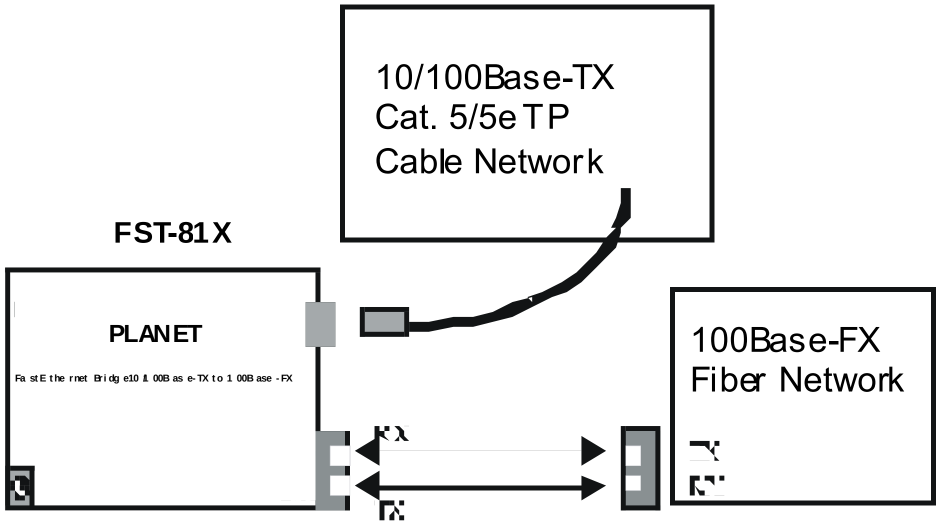
This product provides two different running speeds – 10/100Base-TX and 100Base-FX in the same device and the 10/100Base-TX RJ-45 port can automatically distinguish the speed of incoming connection.

This section describes the hardware installation of FST-81x. Before connecting any network device to the FST-81x, read this chapter carefully.

2.1 Stand-alone Media Converter Installation

The FST-81x can use as a stand-alone Media Converter for Plug & Play and quick network environment deploy, please follow these steps to install the converter:

- Turn off the power of the device/station in a network to which the FST-81x will be attached.
- Ensure that there is no activity in the network.
- Attach fiber cable from the FST-81x to the fiber network. TX, RX must be paired at both ends.
- Attach a Cat. 5 UTP cable from the 10/100Base-TX network to the RJ-45 port on the FT-81x.
- Connect the 5VDC power adapter to the FST-81x and verify that the Power LED lights up.
- Turn on the power of the device/station, the TX Link /Act and FX Link/Act LEDs should light when all cables are attached.

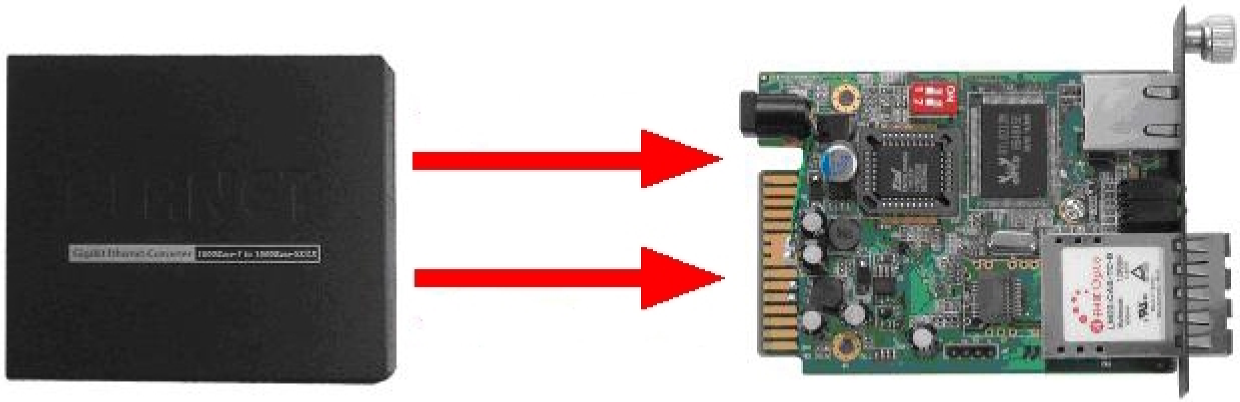


Notice:

- 1. RJ-45/STP, UTP Cat 5, straight/crossover cable is accepted.
- 2. Please refer to Appendix A for more about the wiring distance of your UTP and fiber-Optic cable.

2.2 Slide Media Converter module into MC-1600MR / MC-1610MR series Chassis Installation

Step 1- Unscrew and pull out the FST-81x Media Converter board.



Step 2- Remove a blank faceplate from an empty expansion slot on the front of the Media Converter Chassis. The FST-81x Media Converter board can be installed in any expansion slot.



Step 3- Slide the FST-81x Media Converter board into the expansion slot, aligning it with the guide rails, until it firmly connects to the Media Converter Chassis' backplane.



Step 4- Secure the FST-81x Media Converter board to the chassis by tightening the thumbscrew.

2.3 Real Ethernet environment application

Fiber-Optic Networking for ISP, Enterprise, and Home

The FST-81x provides advanced Media conversion technology- 10/100Base-TX and 100Base-FX interfaces to fulfill different kinds of demand followed with the growth and expanding of the current network. The FST-81x provides diverse fiber connector types for different network applications. It is very flexible for the FST-81x working as a standalone device or being installed in the central Web Smart / Managed Media Converter Chassis for centralized management. When working with the Web Smart / Managed Media Converter Chassis, the FST-81x is hot swappable to avoid network downtime. The FST-81x is the ideal solution to build a network solution of FTTH (Fiber to the Home) or FTTC (Fiber to the Curb), and FTTB (Fiber to the Building) for ISPs, campuses and enterprises.

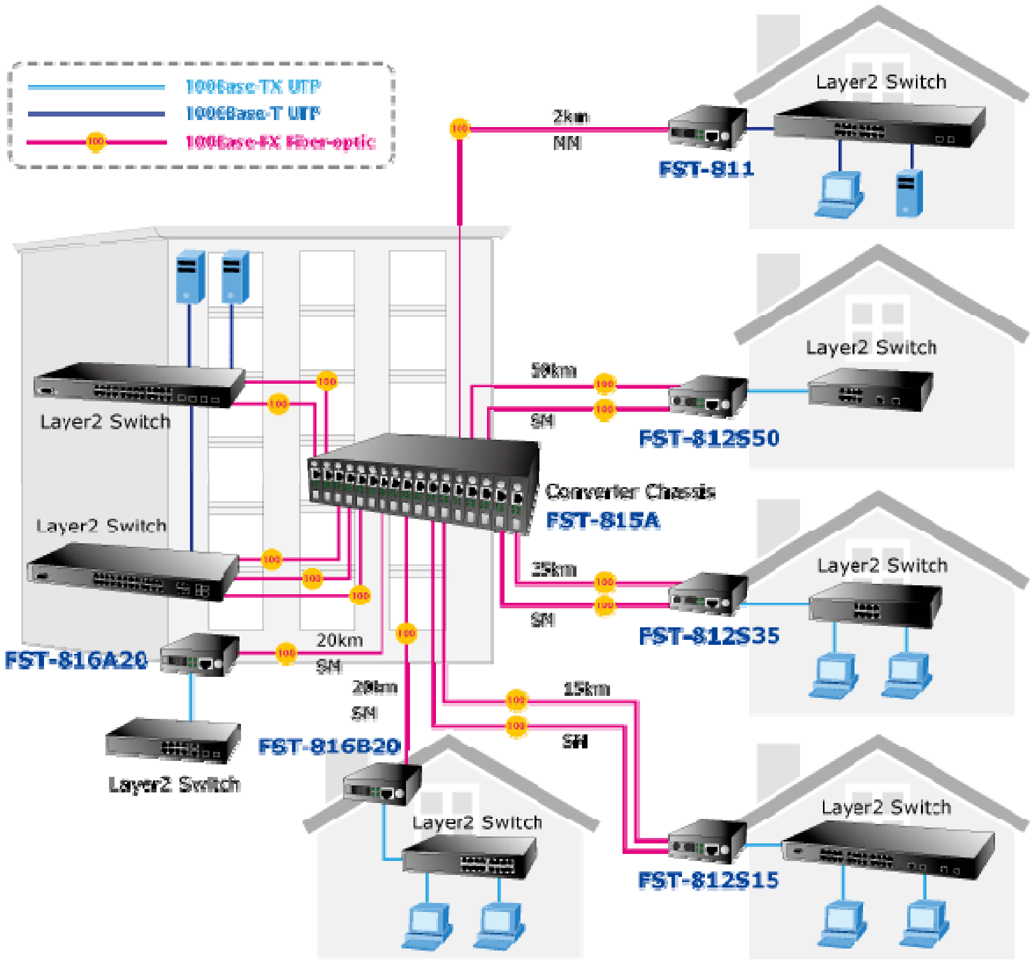


Figure 5: FST-81x Real Ethernet Envirnoment Application

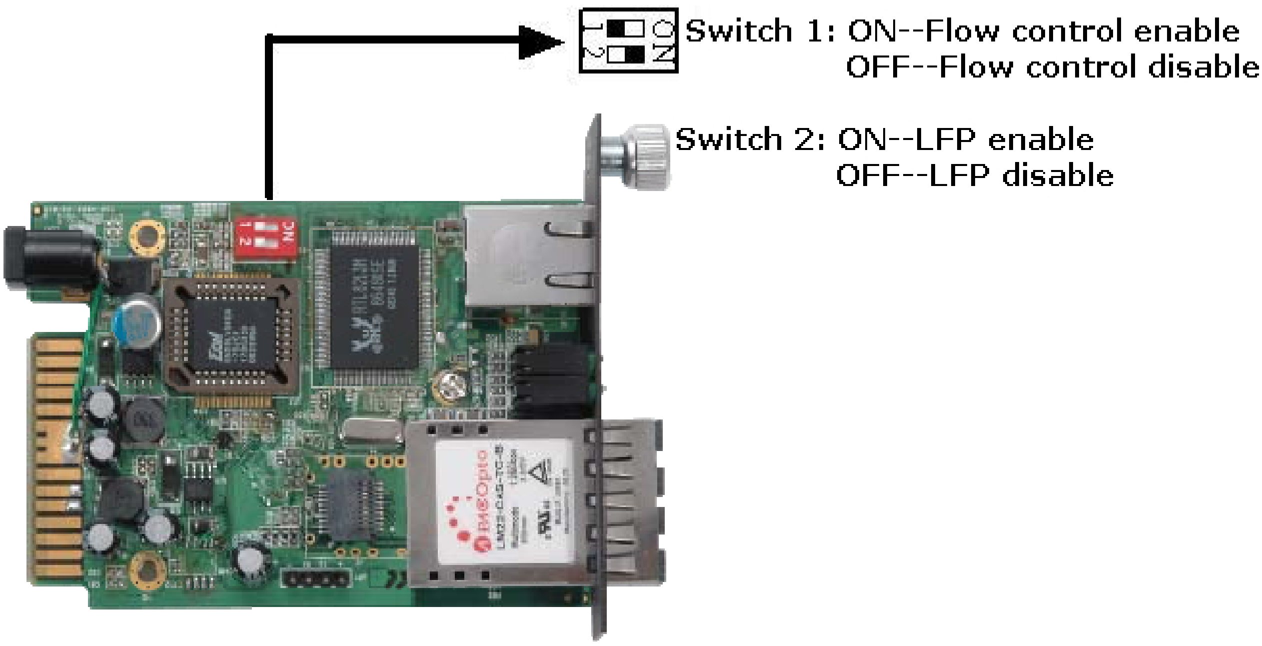
3. MANAGE THE MEDIA CONVERTER

This product provides two different managed methods – configure through its DIP Switch or install into the central Web Smart / Managed Media converter chassis for centralize management.

This section describes how to managed the FST-81x through its DIP Switch and Web Smart / Managed Media converter chassis. Before use the FST-81x smart function, please read this chapter carefully.

3.1 DIP Switch configuration

The FST-81x provide DIP switch to setting Flow control (Disable / Enable) and LFP function (Disable / Enable). Please refer to the table below for more detail decription.



DIP Switch	Mode	Description
DIP Switch 1	On	Enable flow control function of FST-81x.
	Off	Disable flow control function **(Default)**.
DIP Switch 2	On	LFP Enable.
	Off	LFP Disable **(Default)**.

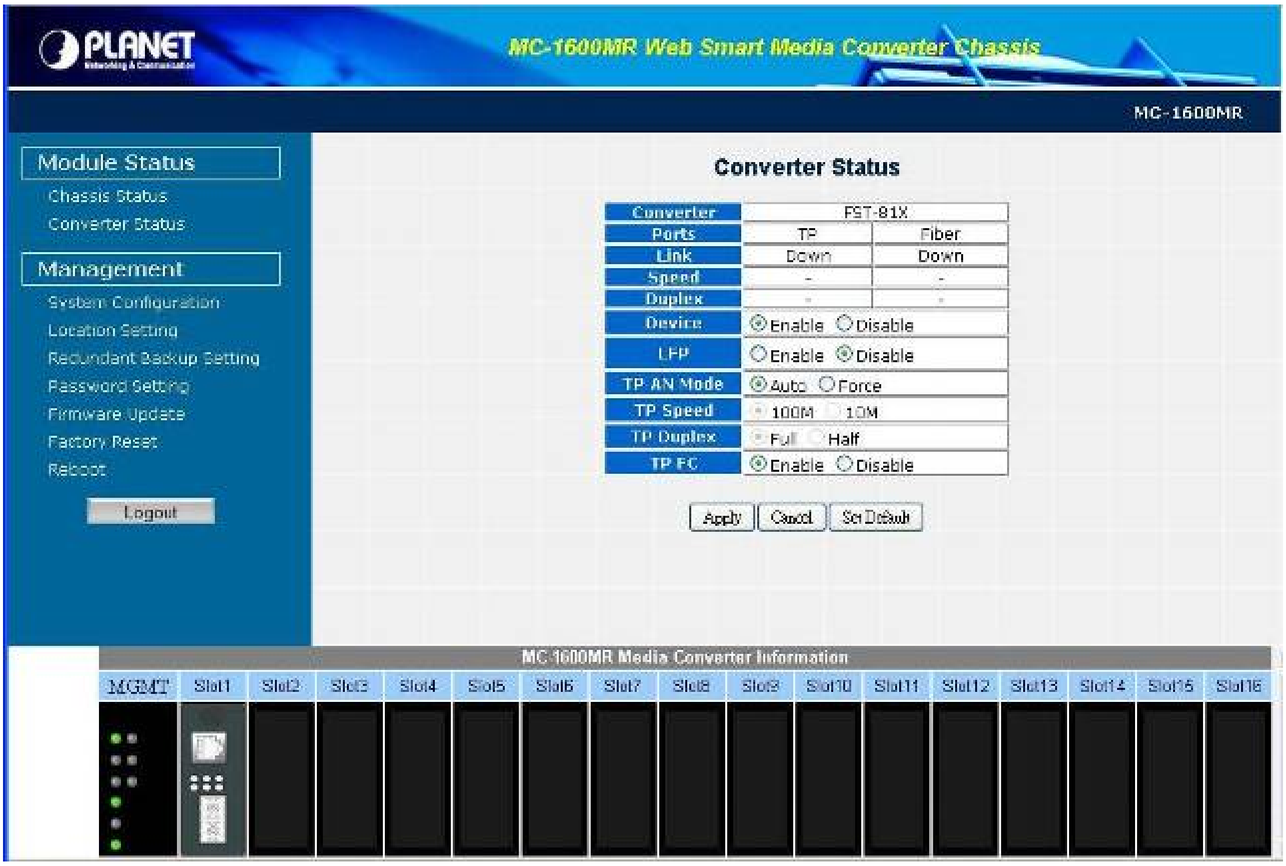
Notice:

1. After change the DIP Switch setting, please power off and power on the FST-81x to take affect.
2. When using two converters, don't enable the both device's LFP function at the same time. The LLR active on both FST-81x series Converter, the fiber link can never be established.

3.2 Managed Media Converter module through MC-1600MR/R48 & MC-1610MR/R48 Chassis

The Web Smart / Managed Media Converter Chassis that can control FST-81x through the management system, FST-81x can be controlled through Web Browser and terminal emulation program.

The Web Smart Media Converter Chassis-MC-1600MR/R48 will display out the status of FST-81x, also the Web Smart Media Converter Chassis can control the function through the management system.



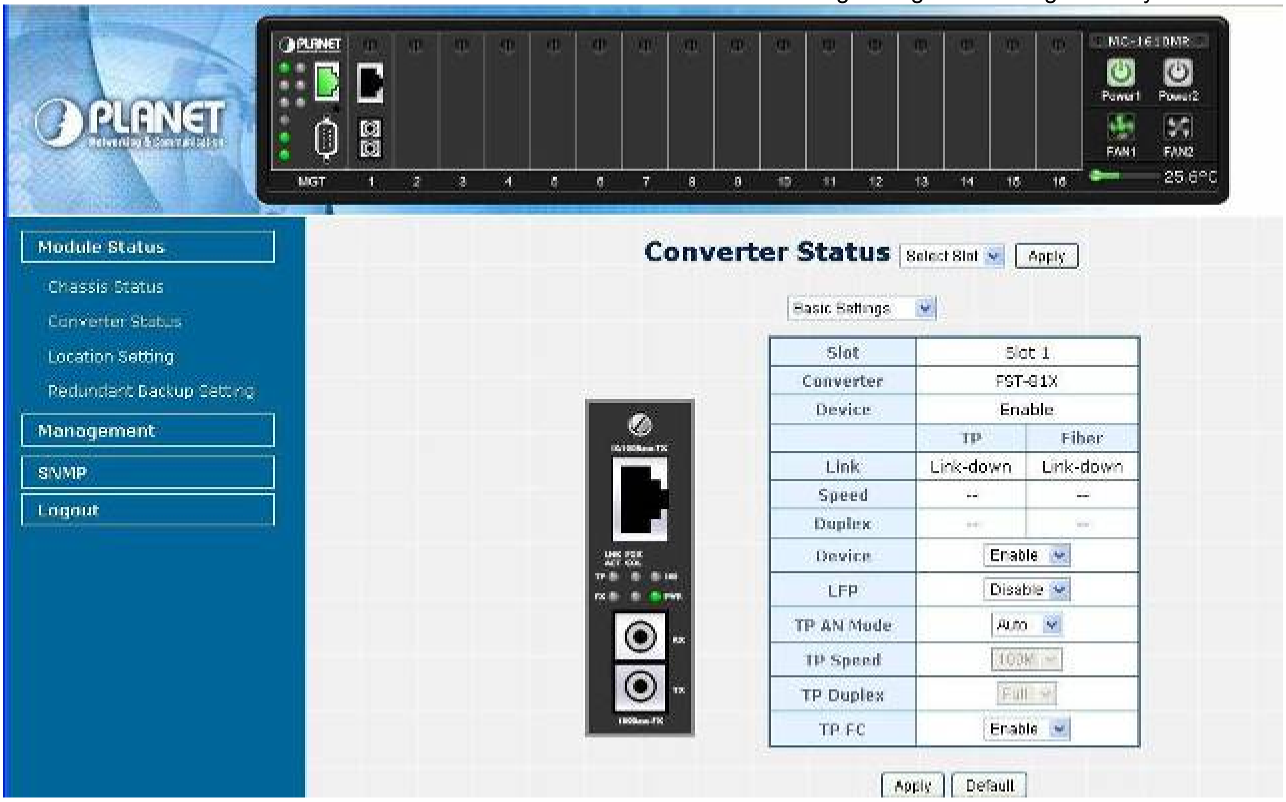
Through the Web Smart Media Converter Chassis System, you can control the setting of FST-81x, such as device (Disable / Enable), LFP (Disable / Enable). TP AN Mode (Auto-negotiation / Force), speed (10/100Mbps), duplex mode (Half / Full duplex mode), Flow control (Disable / Enable).

Item	Description
Device	To enable or disable per FST-81x Converter board.
LFP	To enable or disable the LFP function from FST-81x Converter board.
TP AN Mode	To set the UTP port runs at Auto-negotiation or Forced Mode.
TP Speed	To set the UTP port runs at 100Mbps or 10Mbps.
TP Duplex	To set the UTP port runs at Full duplex or Half duplex mode.
TP FC	To set the Flow Control of the UTP port to enable or disable.

Notice:

Due to firmware structure and restriction of MC-1600MR/R48, the OAM / bandwidth control function not provide in FST-81x setting Web page screen.

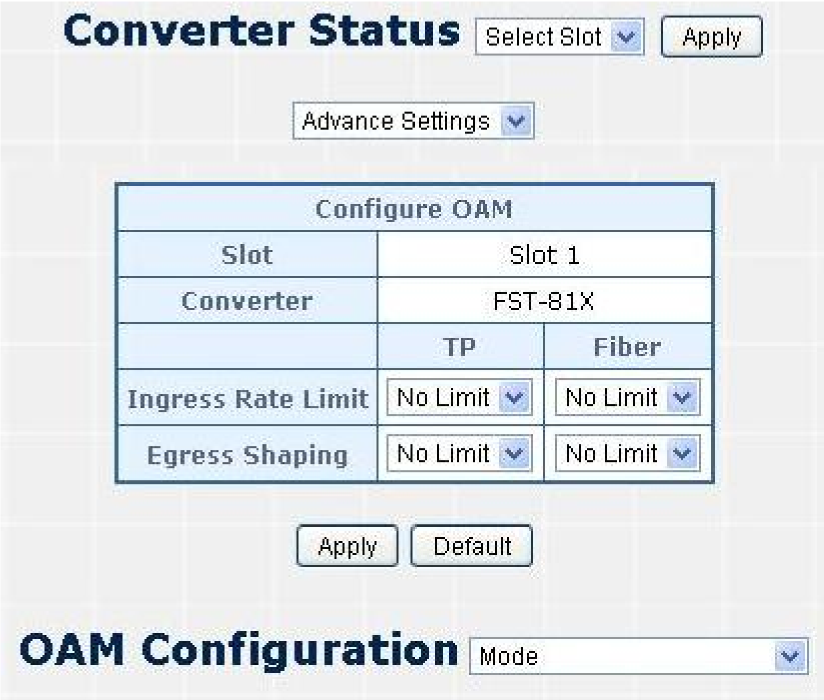
The Managed Converter Chassis-MC-1610MR/R48 will display out the status of FST-81x, also the Managed Media Converter Chassis can control the function and OAM / Bandwidth control setting through the management system.



Through the Managed Media Converter Chassis System, you can control the setting of FST-81x, such as device (Disable / Enable), LFP (Disable / Enable). TP AN Mode (Auto-negotiation / Manual), speed (10/100Mbps) , duplex mode (Half / Full duplex mode), Flow control (Disable / Enable).

Item	Description
Device	To enable or disable per FST-81x Converter board.
LFP	To enable or disable the LFP function from FST-81x Converter board.
TP AN Mode	To set the UTP port runs at Auto-negotiation or Forced Mode.
TP Speed	To set the UTP port runs at 100Mbps or 10Mbps.
TP Duplex	To set the UTP port runs at Full duplex or Half duplex mode.
TP FC	To set the Flow Control of the UTP port to enable or disable.

For easily to know the TP / Fiber port link status of oppsite device, the Managed Media Converter Chassis System provide OAM Setting that include TS-1000 OAM / IEEE 802.3ah OAM / Loop Back Test function. Also the bandwidth control function allow to define available transmit / receive bandwidth on TP / Fiber port of FST-81x.



Item	Description
Ingress Rate Limit	Define receive rate for bandwidth control from TP and Fiber ports of FST-81x.
Egress Shaping	Define transmit rate for bandwidth control from TP and Fiber ports of FST-81x.
OAM Configuration	Provide OAM Configuration on FST-81x.

Notice:

Please refer to manual of Managed Media Converter Chassis (MC-1610MR/R48) for more detail about OAM Setting and bandwidth control function.

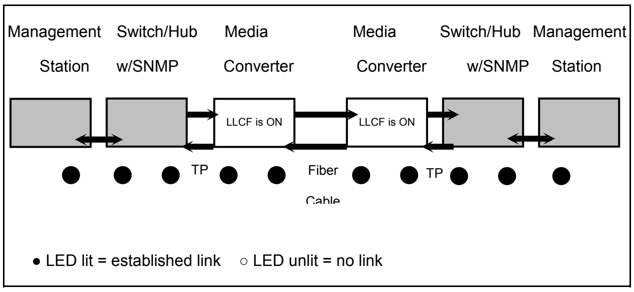
4. LINK PASS THROUGH FUNCTION

The LFP function includes the Link Fault Pass Through function (LLCF/LLR) and the DIP Switch design. LLCF/LLR can immediately alarm administrators the problem of the link media and provide efficient solution to monitor the net. The DIP Switch provides disable or enable the LFP function.

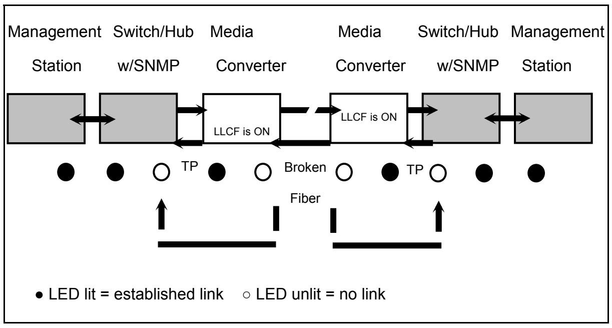
LLCF (Link Loss Carry Forward) means when a device connected to the converter and the TP line loss the link, the converter's fiber will disconnect the link of transmit. LLR (Link Loss Return) means when a device connected to the converter and the fiber line loss the link, the converter's fiber will disconnect the link of transmit. Both can immediately alarm administrators the problem of the link media and provide efficient solution to monitor the net.

4.1 Link Loss Carry Forward (LLCF)

The FST-81x modules incorporates an LLCF function for troubleshooting a remote connection. When LLCF is enabled, the FL / TP ports do not transmit a link signal until they receive a link signal from the opposite port.
The diagram below shows a typical network configuration with a good link status using FST-81x for remote connectivity. Note that LLCF is enabled on DIP switch.



If the connection breaks, FST-81x that link loss forward to the switch/hub which generates a trap to the management station. The administrator can then determine the source of the problem.



Notice:

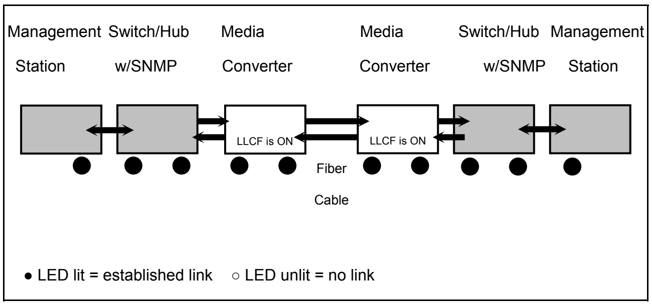
The FST-81x is shipped with the default LFP (LLCF/LLR) function disable. This feature can also be turned on on-purpose. If you are familiar with the network installation and for diagnostic purpose (i.e. check which end is broken), you can turn it on and the converter will take effect immediately. Otherwise, please remain it in the default position.

4.2 Link Loss Return (LLR)

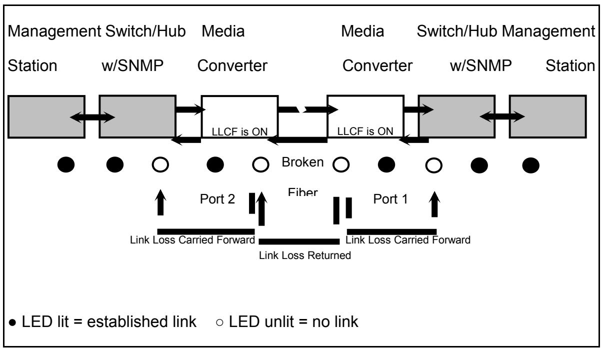
The fiber ports of FST-81x have been designed with an LLR function for troubleshooting a remote connection. LLR works in conjunction with LLCF.

When LLR is enabled*, the port's transmitter shuts down when its receiver fails to detect a valid receive link. LLR should only be enabled on one end of the link and is typically enabled on either the unmanaged or remote device.

The diagram below shows a typical network configuration with a good link status using FST-81x for remote connectivity. Note that LLR and LLCF are enabled as indicated in the diagram.



If one of the optical conductors is bad (as shown in the diagram box below), the converter with LLR enabled will return a no-link condition to its link partner. With LLCF also enabled, the no-link condition is carried forward to the switch/hub where a trap is generated to the management station, and the administrator can then determine the source of the loss.



Notice:

1. The FST-81x is shipped with the default LFP (LLCF/LLR) function disable. This feature can also be turned on on-pu pose. If you are familiar with the network installation and for diagnostic purpose (i.e. check which end is broken), you can turn it on and the converter will take effect immediately. Otherwise, please remain it in the default position.
2. LLR must NOT be active on both ends of a configuration. If it is, the link can never be established.

5. TROUBLESHOOTING

This chapter contains information to help you solve issues. If the FST-81x is not functioning properly, make sure the FST-81x was set up according to instructions in this manual.

The Power LED is not lit

Solution:

Check the power cable connection between power adapter and FST-81x.

Why I connect FST-81x to device with 100Base-FX interface and the 100Base-FX fiber connection fail?

Solution:

1. Please check the fiber connection between two devices is correct.
2. Please check the 100Base-FX interface from both devices run at the same full or half duplex mode.

What device's TP speed can accept by FST-81x TP port?

Solution:

The FST-81x TP port can accept Auto negotiation 10/100Mbps TP Port speed from various devices.

10/100Base-TX port link LED is lit, but the traffic is irregular

Solution:

1. Check that the attached device is not set to dedicate full duplex. Some devices use a physical or software switch to change duplex modes. Auto-negotiation may not recognize this type of full-duplex setting.

2. Check the FST-81x DIP Switch setting and assure the same speed duplex mode setting on FST-81x and attached device.

Why I change the FST-81x DIP switch setting and seems the function without any different?

Solution:

Please power off and power on the FST-81x to take effect.

What is the benefits of TS-1000 OAM and IEEE 802.3ah OAM function of FST-81x?

Solution:

Both functions provide advanced remote device monitor ability that allows network administrator to Remote monitor and automatic notify status indication.

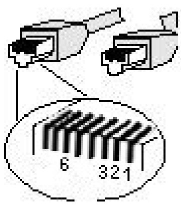
APPENDIX A NETWORKING CONNECTION

A.1 Switch's RJ-45 Pin Assignments

10/100Mbps, 10/100Base-TX

RJ-45 Connector pin assignment		
Contact	MDI Media Dependant Interface	MDI-X Media Dependant Interface -Cross
1	Tx + (transmit)	Rx + (receive)
2	Tx - (transmit)	Rx - (receive)
3	Rx + (receive)	Tx + (transmit)
4, 5	Not used	
6	Rx - (receive)	Tx - (transmit)
7, 8	Not used	

A.2 RJ-45 cable pin assignment



The standard RJ-45 receptacle/connector

There are 8 wires on a standard UTP/STP cable and each wire is color-coded. The following shows the pin allocation and color of straight cable and crossover cable connection:



Figure A-1: Straight-Through and Crossover Cable

Please make sure your connected cables are with same pin assignment and color as above picture before deploying the cables into your network.

A.3 Cable Connection Parameter

The limitations are shown as below;

Duplex	Connection	Limitation (max.)
Twisted Pair		
Half / Full	Node to Node Node to Switch/ Hub	100 meters
Multi-Mode Converters		
MM Half	Node to Node Node to Switch	412 meters
MM Full	Node to Node Node to Switch	2 kilometers
Single-Mode Converters (FST-81xynn; x=2,6; y=S,A,B ; nn=km)		
SM Full	Node to Node Node to Switch	Depends on model

Notice:

1: Consult your local dealer for more about PLANET single mode fiber connectivity.

2. A model (TX: 1310nm; RX: 1550nm) and B model (TX: 1550nm; RX: 1310nm) should runs in pair.

2080-AA1130-001

PLANET Networking & Communication

EC Declaration of Conformity

For the following equipment:

*Type of Product : 10/100Base-TX to 100Base-FX Smart Media Converter
*Model Number : FST-811 / FST-812 / FST-815A / FST-812S15 / FST-812S35 / FST-812S50 / FST-816A20 / FST-816B20
* Produced by:
Manufacturer‘s Name : **Planet Technology Corp.**
Manufacturer‘s Address : 11F, No. 96, Min Chuan Road, Hsin Tien
Taipei, Taiwan , R. O.C.

is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility Directive on (2004/108/EC).
For the evaluation regarding the EMC, the following standards were applied:

Emission	EN 55022	(2006, Class B)
Flicker	EN 61000-3-3	(1995 + A1:2001)
Immunity	EN 55024	(1998 + A1:2001 + A2:2003)
ESD	IEC 61000-4-2	(1995 + A1:1998 + A2:2000)
RS	IEC 61000-4-3	(2002 + A1:2002)
EFT/ Burst	IEC 61000-4-4	(2004)
Surge	IEC 61000-4-5	(1995 + A1:2000)
CS	IEC 61000-4-6	(1996 + A1:2000)
Magnetic Field	IEC 61000-4-8	(1993 + A1:2000)
Voltage Disp	IEC 61000-4-11	(2004)

Responsible for marking this declaration if the:

☒ **Manufacturer** ☐ **Authorized representative established within the EU**

Authorized representative established within the EU (if applicable):

Company Name: **Planet Technology Corp.**

Company Address: **11F, No.96, Min Chuan Road, Hsin Tien, Taipei, Taiwan, R.O.C**

Person responsible for making this declaration

Name, Surname **Kent Kang**

Position / Title : **Product Manager**

Taiwan	**30, Oct., 2009**	Kent Kang
Place	*Date*	*Legal Signature*